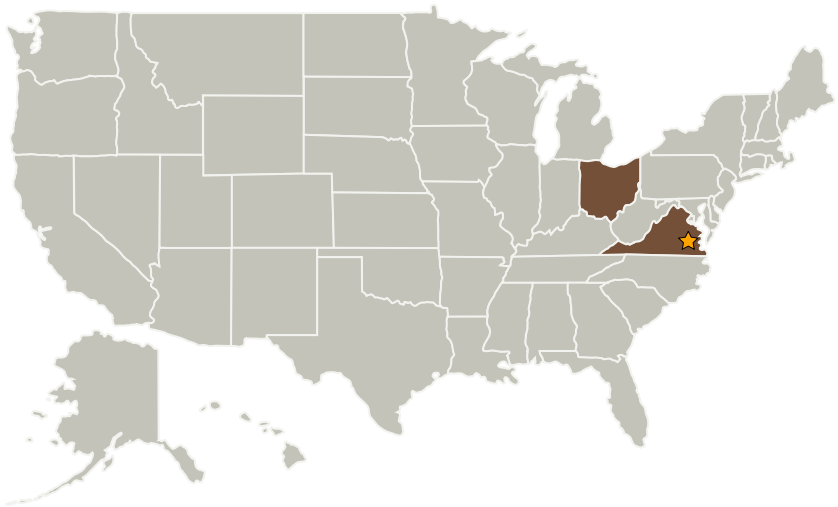
Multifunctional Metal/Polymer Composite Fiber for Space Applications, Phase II

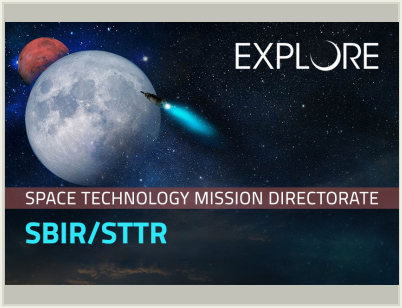
Completed Technology Project (2004 - 2006)

Project Introduction

In this Small Business Innovation Research Phase II Program, Syscom Technology, Inc. will implement an integrated processing scheme to fabricate a conductive multifunctional high-strength, high-modulus Metal/Polymer Composite Fiber (MPCF) for power and signal transfer and electromagnetic interference (EMI) shielding applications in space and aerospace vehicles. The Phase I study has successfully demonstrated that High phosphorous Electroless Nickel (HPEN) can be readily deposited onto properly etched PBO fiber. The HPEN coated PBO fiber showed the superior mass retaining (31.5 to 38.5) characteristic comparing to that of the uncoated PBO fiber in atomic oxygen erosion test. Additionally, the tensile mechanical strength and the DC conductivity of the MPCF essentially unchanged after a fluence of 5.04x1020 (atoms/cm2) atomic oxygen. In Phase II program, the revised processing scheme enables a full control of the processing conditions, such as fiber tension, bath chemistry during each step of the fiber preparation leading to the optimization of the mechanical and electrical properties of the PBO fiber. It is anticipated that the metal coating will not only protect the underlining polymer from harsh space environment, but also affords the resulting MPCF with advantages over metal wires in weight savings, mechanical flexibility, durability and strength.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Syscom Technology, Inc.	Supporting Organization	Industry	Columbus, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials